

DS41

Installation Manual

DS41
INSTALLATION MANUAL

We

DATALOGIC S.p.A.
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Bologna - Italy

declare under our sole responsibility that the product

DS41-XX, Laser Scanner and all its models

to which this declaration relates is in conformity with the following standards or other normative documents

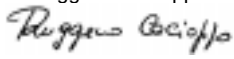
EN 55022, August 1994: LIMITS AND METHODS OF MEASUREMENTS OF RADIO DISTURBANCE CHARACTERISTICS OF INFORMATION TECHNOLOGY EQUIPMENT (ITE)

EN 50082-2, March 1995: ELECTROMAGNETIC COMPATIBILITY. GENERIC IMMUNITY STANDARD. PART 2: INDUSTRIAL ENVIRONMENT

Following the provision of the Directive(s):

89/336 CEE AND SUCCESSIVE AMENDMENTS, 92/31 CEE; 93/68 CEE

Lippo di Calderara, 23.03.1998

Ruggero Cacioppo

Quality Assurance Supervisor

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821000073 (Rev. C)

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DS41

General View

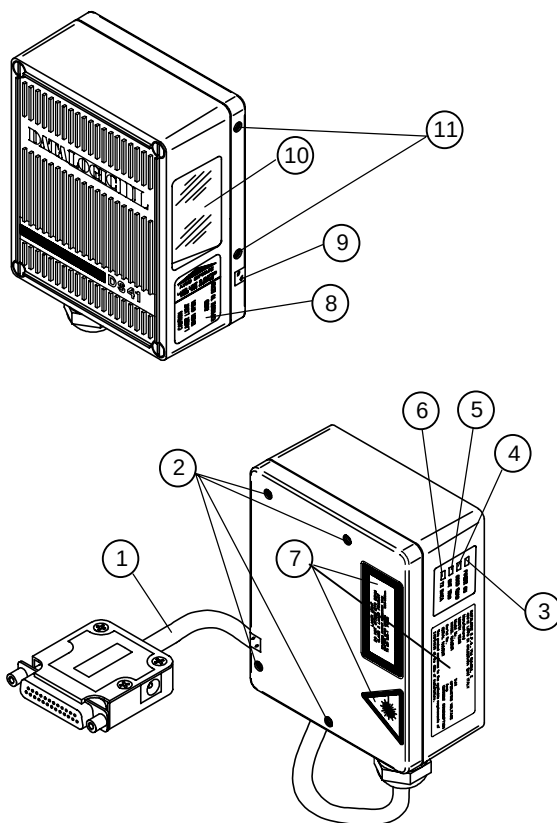


Figure A

- | | |
|-------------------------------|-------------------------------------|
| ① Cable with 25-pin connector | ⑦ Warning and Classification labels |
| ② Mounting holes | ⑧ Warning label |
| ③ Power on LED | ⑨ Laser active LED |
| ④ Successful read LED | ⑩ Laser beam output window |
| ⑤ Presence sensor active LED | ⑪ Accessory mounting holes |
| ⑥ Data transmission LED | |

DS41

General View

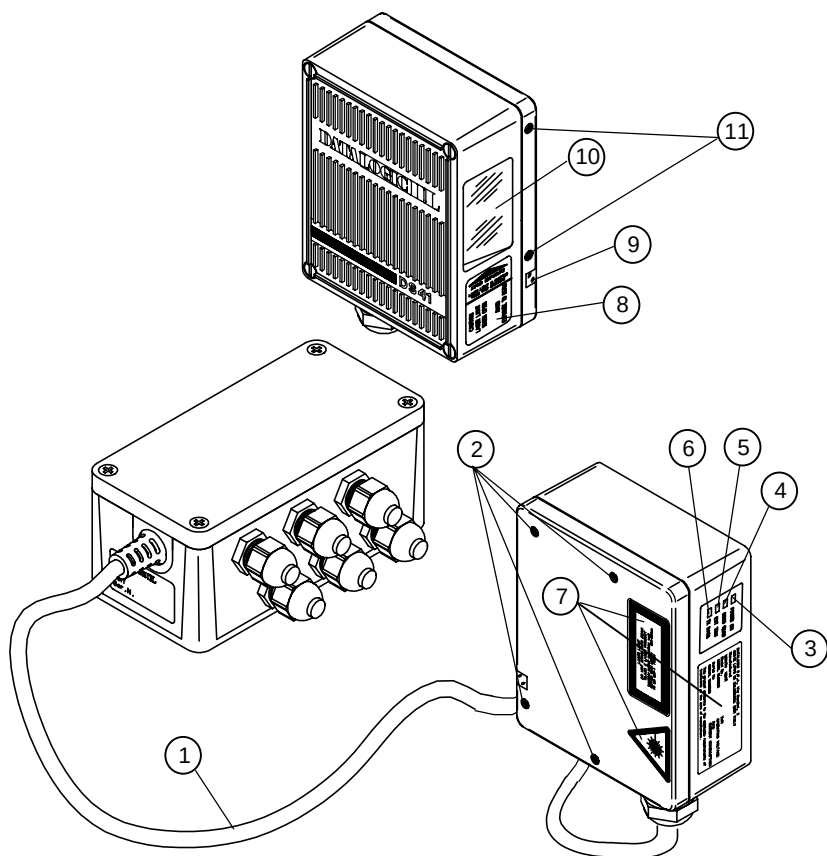


Figure B

- | | |
|------------------------------|-------------------------------------|
| ① Cable with junction box | ⑦ Warning and Classification labels |
| ② Mounting holes | ⑧ Warning label |
| ③ Power on LED | ⑨ Laser active LED |
| ④ Successful read LED | ⑩ Laser beam output window |
| ⑤ Presence sensor active LED | ⑪ Accessory mounting holes |
| ⑥ Data transmission LED | |

SAFETY PRECAUTIONS

LASER SAFETY

The following information is provided to comply with the rules imposed by international authorities and refers to the correct use of the DS41 scanner.

Standard Regulations

This scanner utilizes a low-power laser diode. Although staring directly at the laser beam momentarily causes no known biological damage, avoid staring at the beam as one would with any very strong light source, such as the sun. Avoid that the laser beam hits the eye of an observer, even through reflective surfaces such as mirrors, etc.

This product conforms to the applicable requirements of both IEC 825-1 and CDRH 21 CFR 1040 at the date of manufacture. The scanner is classified as a Class 2 laser product according to IEC 825-1 regulations and as a Class II laser product according to CDRH regulations.

There is a safety device which allows the laser to be switched on only if the motor is rotating above the threshold for its correct scanning speed.

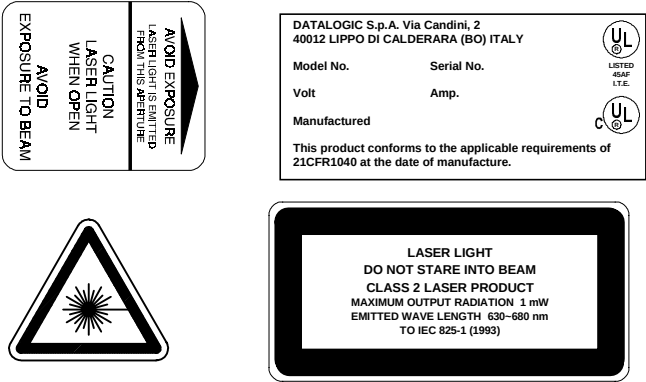
The laser beam can be switched off through a software command (see also “Beam Shutter” in the WINHOST Help On Line).

WARNING

Use of controls or adjustments or performance of procedures other than those specified herein may result in exposure to hazardous visible laser light.

The laser light is visible to the human eye and is emitted from the window on the front of the scanner (Figure A, ⑩).

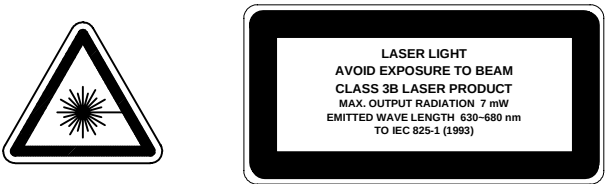
Warning labels indicating exposure to laser light and the device classification are applied onto the body of the scanner (Figure A, ⑧ and ⑦).



Warning and device class labels

Disconnect the power supply when opening the device during maintenance or installation to avoid exposure to hazardous laser light.

The laser diode used in this device is classified as a class 3B laser product according to IEC 825-1 regulations and as a Class IIIB laser product according to CDRH regulations. As it is not possible to apply a classification label on the laser diode used in this device, the following label is reproduced here:



Laser diode class label

Any violation of the optic parts in particular can cause radiation up to the maximum level of the laser diode (7 mW at 630 to 680 nm).

POWER SUPPLY

ATTENTION: READ THIS INFORMATION BEFORE INSTALLING THE PRODUCT

- This product is intended to be installed by Qualified Personnel only.

- **Model DS41-X0:**

This device is intended to be supplied by a UL Listed Direct Plug-in Power Unit marked "Class 2", rated 10-30 V, minimum 0.46 A.

This device may also be supplied by a UL Listed Power Unit with a "Class 2" or LPS power source which supplies power directly to the scanner via the 25-pin connector.

- **Model DS41-X1:**

This device is intended to be supplied via the Junction Box by an NEC Class 2 power source, rated 10-30 V, minimum 0.46 A.

See par. 2.6.2 or 2.7.1 for correct power supply connections.

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1 GENERAL FEATURES

1.1 INTRODUCTION

The DS41 scanner is a barcode reader complete with decoder, available in 16 standard models. These were designed to satisfy the most demanding requirements associated with high performance scanning.

Standard Application Program

A Standard Application Program is factory-loaded onto the DS41. This program controls barcode reading, serial port interfacing, data formatting and many other operating and control parameters.

It is completely user configurable from a host computer using the WINHOST interface utility program provided on diskette with the scanner or using the Host Mode programming procedure, by ESC sequences via the serial interface.

There are four different programmable operating modes to suit various barcode reading system requirements. Included in these is a test mode to verify the reading features and exact positioning of the scanner without using external tools.

C Programmability

The DS41 belongs to the generation of Datalogic scanners that operate under the 'C' programming environment which is a recognized industry standard.

If your requirements are not met by the Standard Application Program, Custom Application Programs can be developed by your local Datalogic distributor.

1.2 DESCRIPTION

Some of the main features of this scanner are given below:

- very high scanning speed (800 scans/sec).
- raster versions available.
- completely configurable from host computer.
- 2 serial communication interfaces; one can be set as RS232, RS485, or 20 mA C.L., and the other is an RS232 auxiliary interface.
- reads all popular codes.
- supply voltage from 10 to 30 Vdc.
- test mode to verify the reading features and exact positioning of the scanner without the need for external tools.
- configurable in different operating modes to suit the most various barcode reading system requirements.
- code verifier
- possibility to detect the absolute position of the label in the scan line (for DSP models only, see paragraph 1.3).
- PCS verification (for DSP models only, see paragraph 1.3).

The DS41 scanner uses a solid state laser diode as a light source; the light emitted has a wavelength between 630 and 680 nm. Refer to the section "Safety Precautions" at the beginning of this manual for information on laser safety.

The use of a semiconductor laser has made it possible to develop an extremely compact scanner with low power consumption. The reader is contained in a rugged aluminum housing; the mechanical dimensions are 101 x 83.5 x 42 mm and it weighs about 800 g.

The protection class of the enclosure is IP65, therefore the reader is particularly suitable for industrial environments where high protection against harsh external conditions is required.

Electrical connection is provided through a cable on the side of the reader; this cable is terminated with a 25-pin connector (25-pin connector models, see paragraph 1.3, Figure A, ①) or by a junction box (junction box models, see paragraph 1.3, Figure B, ①).

The laser beam output window is on the right hand side of the scanner (Figure A, ⑩). A green LED on the same side indicates the laser is active (Figure A, ⑨).

A security system allows the laser to activate only once the motor has reached the correct rotational speed; consequently the laser beam is generated after a slight delay from the power on of the scanner.

The four LEDs on the left hand side of the scanner indicate the following:

POWER ON	LED (red) (Figure A, ③) indicates the reader is connected to the power supply.
GOOD READ	LED (red) (Figure A, ④) is used to signal successful barcode decoding. It is also used in Test mode to signal the decoding percentage (for details refer to the section "Test Mode" in the WINHOST Help On Line).
EXT TRIG	LED (yellow) (Figure A, ⑤) indicates the code presence sensor is active (for details refer to the section "On Line Mode" in the WINHOST Help On Line).
TX DATA	LED (green) (Figure A, ⑥) indicates data transmission on the main serial output line.

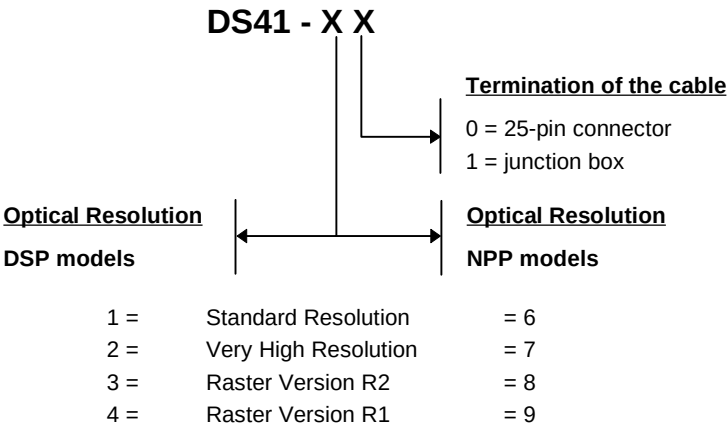
The screw holes on the body of the reader are for mechanical fixture (Figure A, ②); the screw holes shown in Figure A, ⑪ are to attach accessories such as the optional 90° mirror.

1.3 AVAILABLE MODELS

The DS41 scanner is available in versions that differ in regard to the following parameters:

- Resolution
- Termination of the cable
- Distance between the scan beams (raster models only)
- DSP or NPP

The following models are therefore available:



All models perform 800 scans/sec.

1.4 ACCESSORIES

The following accessories are available on request for the DS41:

- 90° deflection mirror GFC-41

2 INSTALLATION

2.1 PACKAGE CONTENTS

Verify that the DS41 reader and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

- 1) DS41 reader with cable
 - 2) Installation manual
 - 3) Barcode test chart(s)
 - 4) DS41 communication and utility program disk
 - 5) Mounting kit
 - Mounting screws and washers (4 ea.)
 - Mounting bracket (1)
- * Junction box (for junction box models only, see paragraph 1.3)

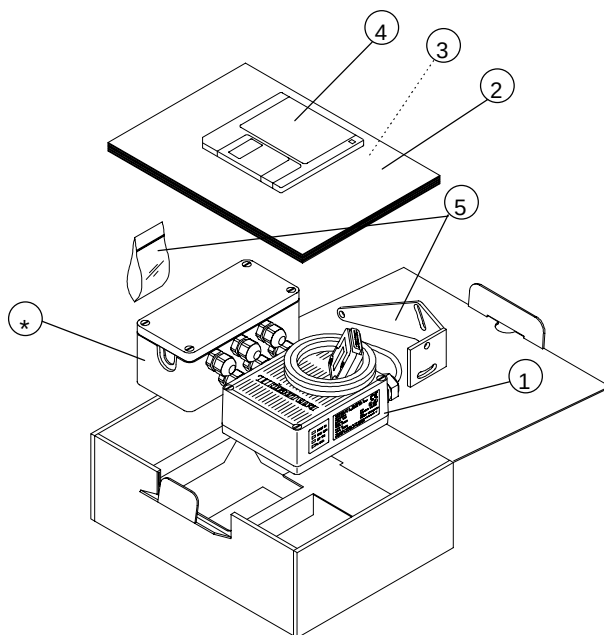


Figure 2.1 - DS41 package contents

2.2 GUIDE TO INSTALLATION

The following can be used as a checklist to verify all of the steps necessary for complete installation of the DS41 scanner.

- 1) Read all information in the section "Safety Precautions" at the beginning of this manual.
- 2) Open the scanner to select the main serial interface type as required (see paragraphs 2.3 and 2.4).
- 3) Correctly position and mount the scanner for barcode reading according to the information in paragraphs 2.5, 2.8 and 3.4.
- 4) Provide correct system cabling according to the signals necessary (see the applicable sub-paragraphs under 2.6 or 2.7).
- 5) Configure the software parameters from a host computer using either the WINHOST interface utility program provided on diskette, or using the Host Mode programming procedure, by ESC sequences via the serial interface.

For more details about these configuration methods refer to the section "DS41 Configuration" in the WINHOST Help On Line.

NOTE

Fine tuning of the scanner position for barcode reading can be accomplished using the Test Mode. For further details refer to the section "Test Mode" in the WINHOST Help On Line.

The installation is now complete.

2.3 OPENING THE DEVICE

Before installing the DS41 it may be necessary to open the scanner to select the interface required.

WARNING

The scanner must be disconnected from the power supply during this operation.

Refer to the following instructions and diagram below when opening the reader:

- Unscrew the four screws as shown below to open the scanner for access to the output interface jumper.
- Carefully remove the cover of the scanner. Avoid any contact with the mirrored rotor, the lenses, or other optical components.

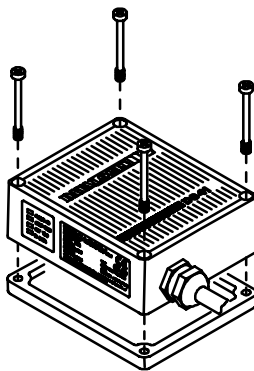


Figure 2.2 - Opening the DS41

2.4 MAIN INTERFACE SELECTION

One of the following interface types can be selected to connect the main interface of the DS41 to the host computer.

- EIA RS232
- 20 mA CURRENT LOOP
- EIA RS485 POLLED
- EIA RS485 NON POLLED

To select the interface type, position the jumper block as indicated in the diagram below:

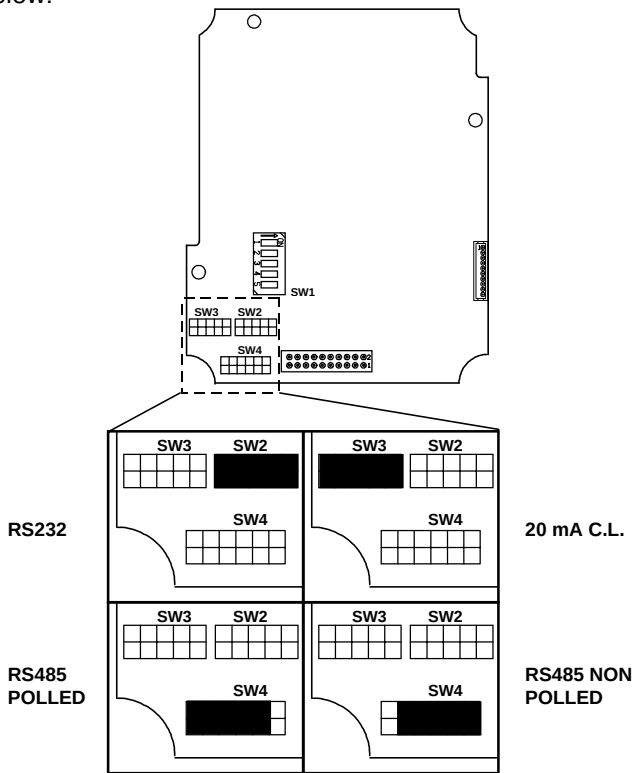


Figure 2.3 - Interface type selection

The RS232 interface type is factory set.

2.5 MECHANICAL INSTALLATION

DS41 can be installed to operate in different positions. The four screw holes (M4 x 5) on the body of the reader are for mechanical fixture (Figure A, ②).

The diagram below gives the overall dimensions of the scanner and may be used for its installation.

Refer to paragraph 2.8 for correct positioning.

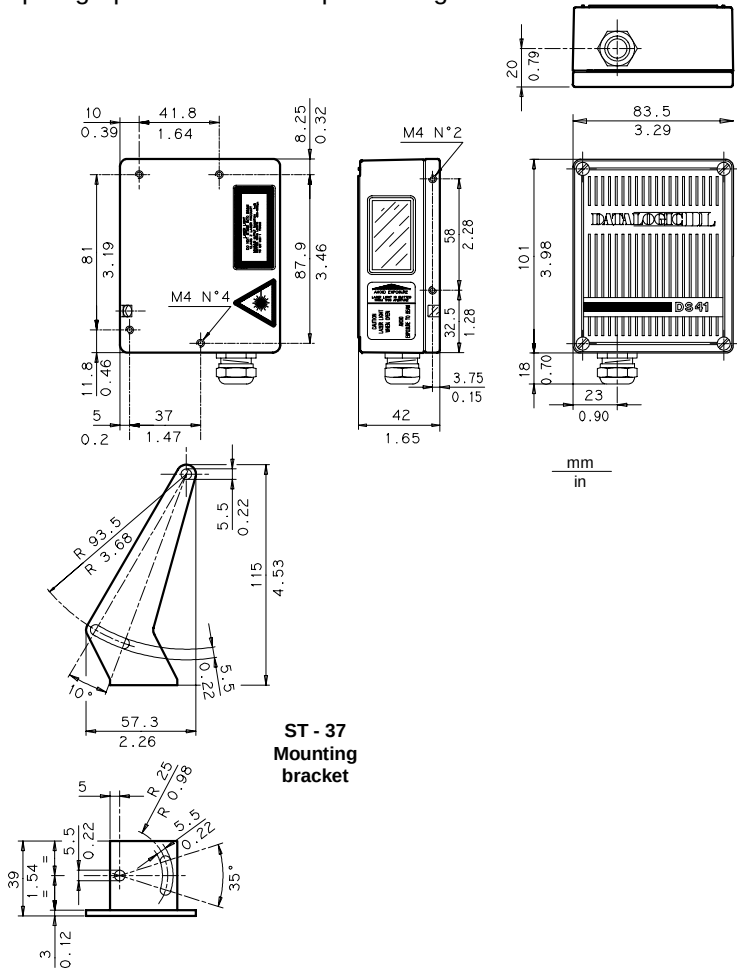


Figure 2.4 - Overall dimensions

2.6 JBOX INSTALLATION

JBOX provides a passive connection between your scanner and the outside world in a fast and practical way. It represents an alternative to the 25-pin connector models. Figure 2.5 shows the basic layout of DS41 using the junction box.

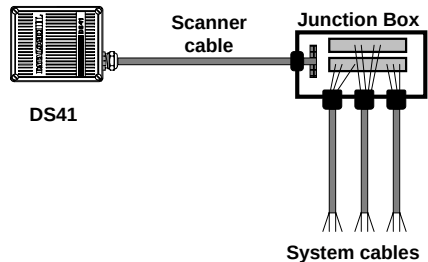


Figure 2.5 - Scanner using JBOX

For JBOX connections, the scanner has a cable that terminates in a 24-pin connector that plugs into the junction box. The system cables pass through 6 glands in the side of the JBOX and the individual wires connect to spring clamp terminal blocks inside which provide access to all scanner signals.

2.6.1 Mounting JBOX

The diagram below shows the dimensions of the junction box and its relative mounting holes.

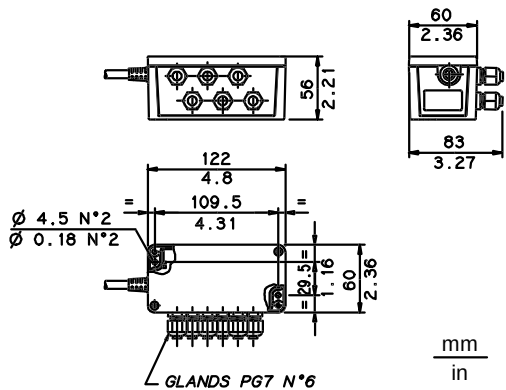


Figure 2.6 - JBOX dimensions

JBOX is designed to be mounted to a panel of metal, plastic or other appropriate material using the mounting screws provided in the package. To do this:

- 1) Open the junction box by unscrewing the 4 cover screws.

If necessary, using the two mounting holes inside the junction box as a pattern, mark the panel with an appropriate object and then drill two small pilot holes in the panel.

- 2) Align the junction box and insert the two self-threading screws with their washers and screw them into the panel until tight (see Figure 2.7).

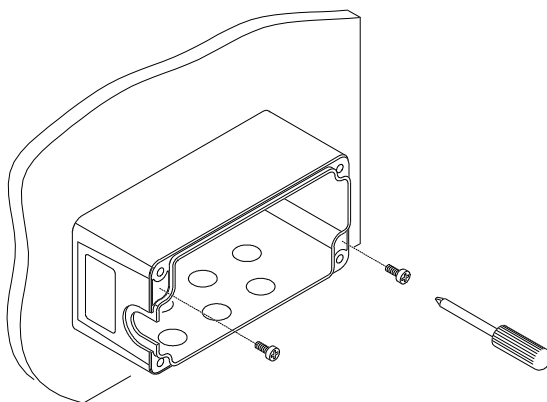


Figure 2.7 - Mounting JBOX

2.6.2 Electrical Connections for JBOX

The connection and wiring procedure for JBOX is described as follows:

- 1) Open the junction box by unscrewing the 4 cover screws.
- 2) Pass all System cables through the glands in the junction box housing.
- 3) To connect the power and input/output signals:
 - Prepare the individual wires of the system cables by stripping the insulation back approximately 11 mm.
 - Using a device such as a screwdriver, push down on the orange lever directly above the clamp (see Figure 2.8).
 - Insert the wire into the clamp and release the lever.

The wire will now be held in the spring clamp.

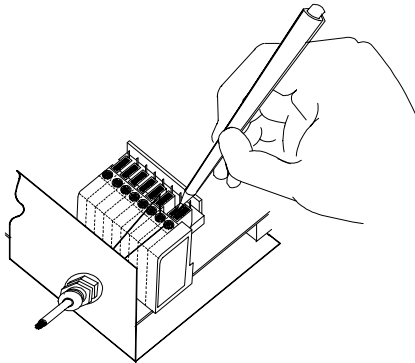


Figure 2.8 - System cable connections to the junction box

The wiring used can be solid or stranded but must meet the following specifications.

Positions 1-4:	24 - 16 AWG	0.2 - 1.5 mm ²
Positions 5-39:	26 - 20 AWG	0.14 - 0.5 mm ²

The junction box pinouts are indicated in the following table:

JBOX pinout for DS41	
Pin	Name
01	VS
02	SGND
03	VS
04	SGND
05	CHASSIS
06	VS
07	VS
08	PS+
09	PS-
10	SGND
11	SGND
12	VS
13	VS
14	n.c.
15	n.c.
16	SGND
17	SGND
18	NOREAD+
19	NOREAD-
20	RIGHT+
21	RIGHT-
22	WRONG+
23	WRONG-
*24	TX232/TX485+/CLOUT +
*25	RTS232/TX485-/CLOUT-
*26	SGND
27	n.c.
28	SGND
29	TX232/TX485+/CLOUT+
30	RTS232/TX485-/CLOUT-
31	SGND
32	RX232/RX485+/CLIN+
33	CTS232/RX485-/CLIN-
34	SGND
35	TXAUX
36	RTSAUX
37	SGND
38	RXAUX
39	CTSAUX

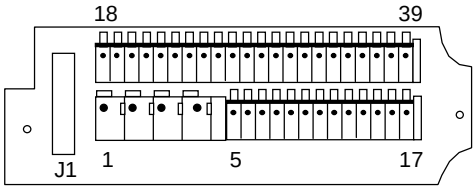


Figure 2.9 - JBOX connector and pinout

To allow connection of an NEC Class 2 Power Unit, use a correct female plug adapter.

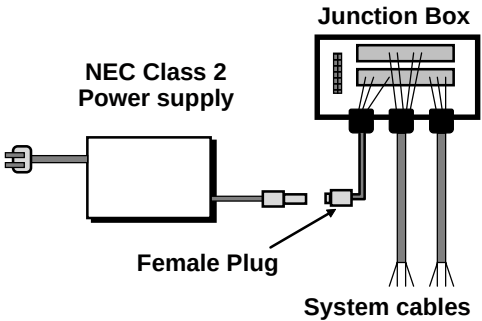


Figure 2.10 - NEC Class 2 Power unit connections

* The signals on pins 24, 25, and 26 are repeated on pins 29, 30, and 31 to facilitate network connections (i.e. Multiplexer connections using the RS485 Polled Interface). In this way the network bus can enter and exit the junction box from different spring clamps but be physically connected together.

- 4) After wiring the junction box and while the scanner is unplugged from the power supply, place the Scanner cable so that the rubber seal fits into the cutout in the housing of the junction box and plug the 24-pin connector into connector J1 on the PCB inside the junction box as shown in figure 2.11.

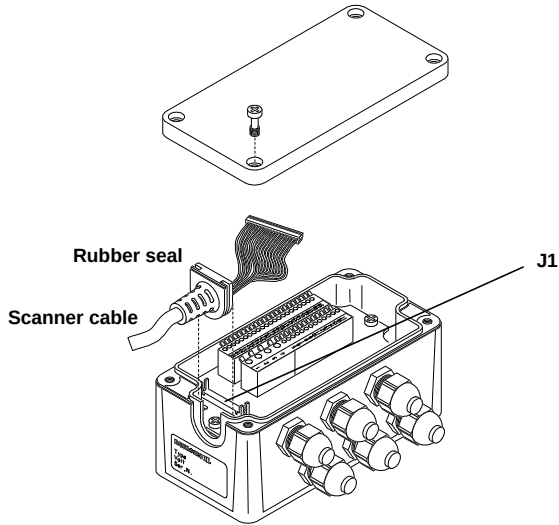


Figure 2.11 - Scanner cable connections to the junction box

- 5) Close the junction box using the 4 cover screws making sure the rubber seal is fitted correctly between the parts of the housing.

The junction box is now installed which completes the electrical connections for your scanning system.

If it ever becomes necessary to disconnect the scanner from the JBOX, simply reverse the procedure in step 4.

2.7 ELECTRICAL CONNECTIONS FOR 25-PIN MODELS

25-pin connector models (see paragraph 1.3) are equipped with a cable terminated by a 25-pin D-sub connector for connection to the power supply and input/output signals. The details of the connector pins are indicated in the following table:

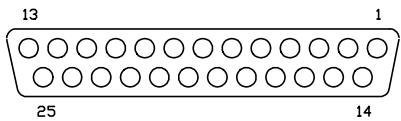


Figure 2.12 - 25-pin D-sub connector

25-pin D-sub connector pinout		
Pin	Name	Function
13	VS	Power supply input voltage (+)
25	SGND	Power supply input voltage (-)
1	CHASSIS	Chassis Ground
9	VS	Presence sensor supply voltage (+)
18	PS+	Presence sensor (+)
19	PS-	Presence sensor (-)
8	NO READ +	No read output (+)
22	NO READ -	No read output (-)
11	RIGHT +	Right read output (+)
12	RIGHT -	Right read output (-)
14	WRONG +	Wrong read output (+)
15	WRONG -	Wrong read output (-)
2*	TX232/TX485+/CLOUT+	* Main interface signals (see par. 2.7.2)
3*	RX232/RX485+/CLIN+	
4*	RTS232/TX485-/CLOUT-	
5*	CTS232/RX485-/CLIN-	
7	SGND	Signal Ground
20	RXAUX	Auxiliary input
21	TXAUX	Auxiliary output
23	CTSAUX	Auxiliary handshake
24	RTSAUX	Auxiliary handshake
6, 10, 16, 17	NC	No Connect

* Pins 2, 3, 4, and 5 of the 25-pin connector have different meanings depending on which interface type is selected. To select the interface type, follow the instructions in paragraphs 2.3 and 2.4.

2.7.1 Power supply

Power can be supplied to the scanner through the pins provided on the 25-pin connector used for communication with the host (Figure 2.13):

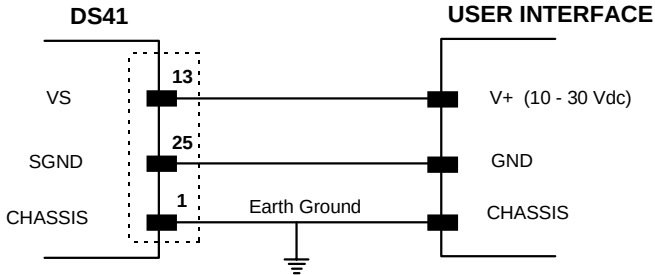


Figure 2.13 - Power supply connections

or through the jack connector on the side of the 25-pin connector for connections to a UL Listed Direct Plug-in Power Unit (Figure 2.14). If the jack input is used to supply power to the DS41, pin 13 is automatically disconnected; the supply voltage for the presence sensor remains on pin 9. The plug connector is not supplied with the DS41.

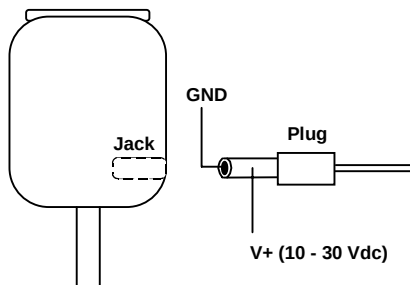


Figure 2.14 - Power supplied using the jack connector

The power must be between 10 and 30 Vdc only. There is a current peak of about 1A at 10 V during power on caused by the motor starting.

It is recommended to connect pin 1 (CHASSIS) to a common earth ground.

2.7.2 Main serial interface

The signals relative to the following serial interface types are available on the input/output connector:

EIA RS232

EIA RS485 NON POLLED

EIA RS485 POLLED

(for connection with a Datalogic multiplexer)

20 mA PASSIVE CURRENT LOOP

DS41 automatically recognizes the type of interface selected at each power on of the scanner.

If the recognized interface type is not compatible with the current communication handshaking, then the system forces the XON/XOFF protocol.

The parameters relative to the interface selected (baud rate, data bits, etc.) can be configured using the WINHOST utility program or Host Mode programming. For more details refer to the section "Main Interface Menu" in the WINHOST Help On Line.

Details regarding the connections and use of the main interface selection are given in the next paragraphs.

RS232 interface

The serial interface is used in this case for point to point connections; it handles communication with the host computer and allows both transmission of code data and the configuration of the scanner. This is the default interface.

The following pins of the 25-pin connector are used for RS232 interface connection:

Pin	Name	Function
2	TX232	Transmitted Data
3	RX232	Received Data
4	RTS232	Request To Send
5	CTS232	Clear To Send
7	SGND	Signal Ground

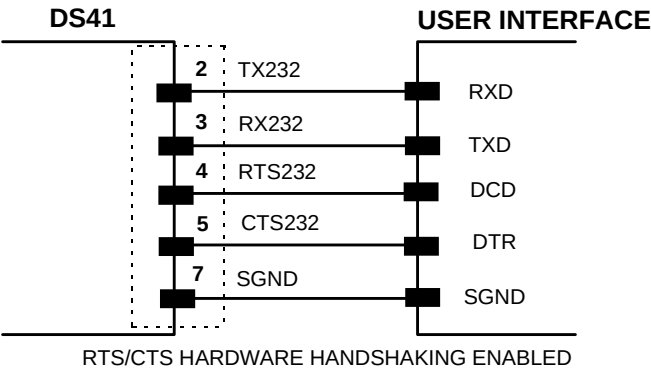


Figure 2.15 - RS232 main interface connections

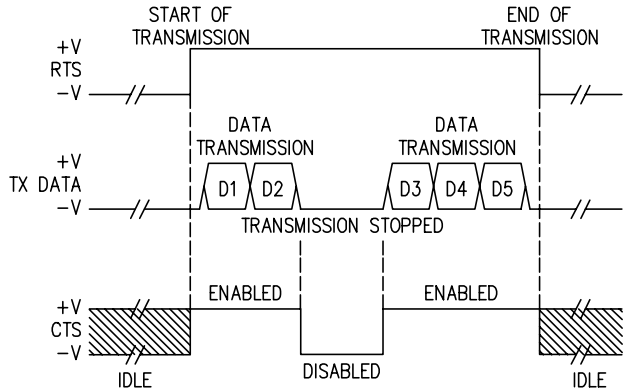


Figure 2.16 - RS232 control signals

The RTS232 and CTS232 signals control data transmission and synchronize the connected devices.

If the RTS/CTS handshaking protocol is enabled, the DS41 activates the RTS232 output to indicate a message is to be transmitted. The receiving unit activates the CTS232 input to enable the transmission.

RS485 non polled interface

The RS485 NON POLLED interface is a Full Duplex interface.

The NON POLLED configuration is used for point to point connections over longer distances than those acceptable for RS232 communications or in electrically noisy environments.

The following pins of the 25-pin connector are used for RS485 NON POLLED communications:

Pin	Name	Function
2	TX485+	RS485 output (+)
4	TX485-	RS485 output (-)
3	RX485+	RS485 input (+)
5	RX485-	RS485 input (-)
7	SGND	Signal Ground

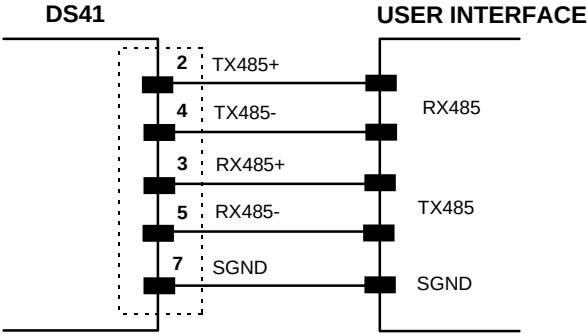


Figure 2.17 - RS485 NON POLLED connections

To select this interface type, follow the instructions in paragraphs 2.3 and 2.4.

RS485 polled interface

The RS485 POLLED interface is a Half Duplex (3 wires + shield) interface.

The POLLED configuration can be used for multidrop connections with a Datalogic multiplexer or it can also be used for a master-slave layout (see paragraph 2.9.1).

The following pins of the 25-pin connector are used for RS485 POLLED communications:

Pin	Name	Function
2	TX485+	RS485 input/output (+)
4	TX485-	RS485 input/output (-)
7	SGND	Signal Ground

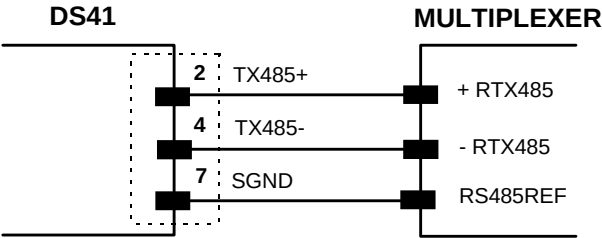


Figure 2.18 - RS485 POLLED connections

To select this interface type, follow the instructions in paragraphs 2.3 and 2.4.

For this interface type, the multidrop address must also be set on the DIP switch as shown in the figure below. Record this information for further setup of the multidrop line.

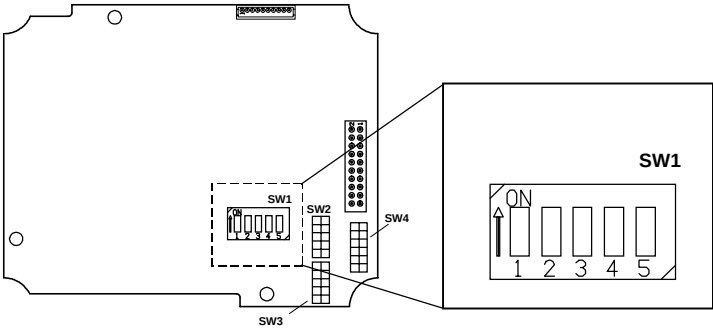


Figure 2.19 - DIP switch for multidrop address selection

The following table shows the address settings where:

Position					Address	Position					Address
1	2	3	4	5		1	2	3	4	5	
1	1	1	1	1	31	0	1	1	1	1	15
1	1	1	1	0	30	0	1	1	1	0	14
1	1	1	0	1	29	0	1	1	0	1	13
1	1	1	0	0	28	0	1	1	0	0	12
1	1	0	1	1	27	0	1	0	1	1	11
1	1	0	1	0	26	0	1	0	1	0	10
1	1	0	0	1	25	0	1	0	0	1	9
1	1	0	0	0	24	0	1	0	0	0	8
1	0	1	1	1	23	0	0	1	1	1	7
1	0	1	1	0	22	0	0	1	1	0	6
1	0	1	0	1	21	0	0	1	0	1	5
1	0	1	0	0	20	0	0	1	0	0	4
1	0	0	1	1	19	0	0	0	1	1	3
1	0	0	1	0	18	0	0	0	1	0	2
1	0	0	0	1	17	0	0	0	0	1	1
1	0	0	0	0	16	0	0	0	0	0	0

1 = ON

0 = OFF

The figure below shows a multidrop configuration with DS41 scanners connected to a Multiplexer.

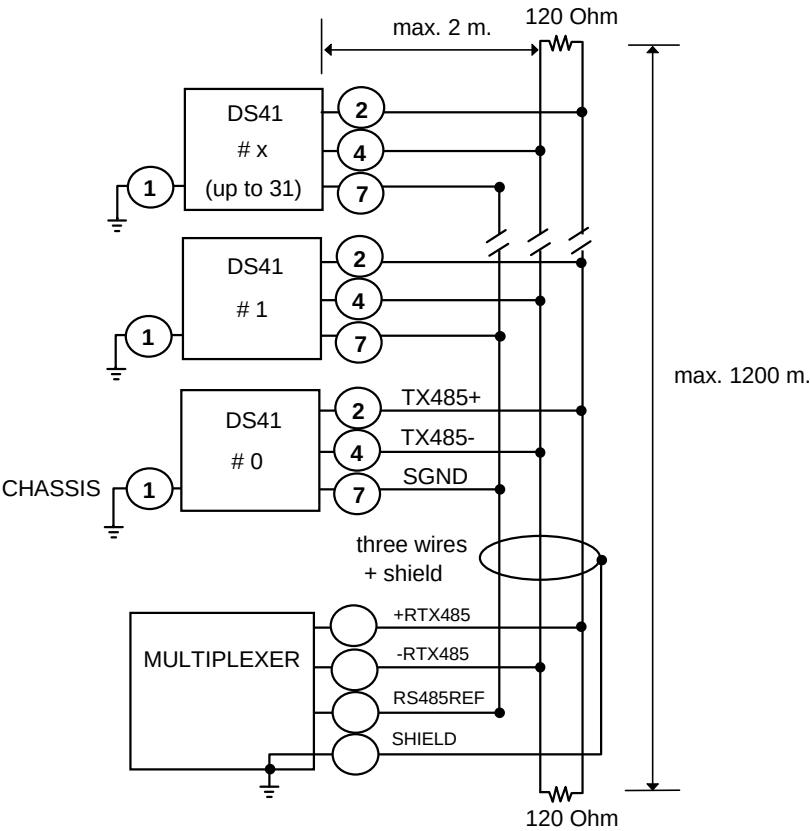


Figure 2.20 - DS41 multidrop connection to a Multiplexer

20 mA current loop interface

The DS41 only supports passive type current loop connections. The following pins of the 25-pin connector are used:

Pin	Name	Function
5	CLIN-	Current Loop Input (-)
3	CLIN+	Current Loop Input (+)
4	CLOUT-	Current Loop Output (-)
2	CLOUT+	Current Loop Output (+)

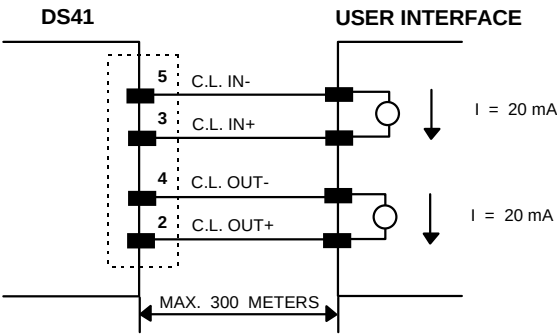


Figure 2.21 - 20 mA C.L. connections

To select this interface type, follow the instructions in paragraphs 2.3 and 2.4.

2.7.3 Auxiliary RS232 interface

The auxiliary serial interface is used exclusively for RS232 point to point connections.

The parameters relative to the auxiliary interface (baud rate, data bits, etc.) as well as particular operating modes such as local echo can be defined using the WINHOST utility program or Host Mode programming. For more details refer to paragraph 2.9 and to the section "Auxiliary Interface Menu" in the WINHOST Help On Line.

The following pins of the 25-pin connector are used to connect the RS232 auxiliary interface:

Pin	Name	Function
20	RXAUX	Auxiliary input
21	TXAUX	Auxiliary output
23	CTSAUX	Auxiliary handshake
24	RTSAUX	Auxiliary handshake
7	SGND	Signal Ground

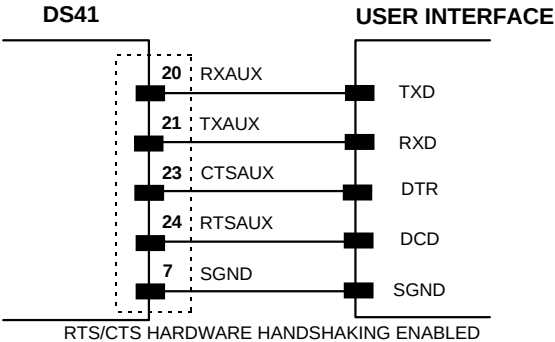


Figure 2.22 - RS232 auxiliary interface connections

The RTSAUX and CTSAUX signals control data transmission and synchronize the connected devices. If the RTS/CTS handshaking protocol is enabled, the DS41 activates the RTSAUX output to indicate a message is to be transmitted. The receiving unit activates the CTSAUX input to enable the transmission.

2.7.4 Inputs

The inputs available on the DS41 scanner are the pins relative to the code presence sensor, as indicated below:

Pin	Name	Function
18	PS+	Presence sensor (input+)
19	PS-	Presence sensor (input-)

The inputs indicated are always used to connect the code presence sensor which tells the scanner to scan for a code. The yellow led (Figure A, ⑤) is on during the active phase of the PS signal indicating that decoding can take place.

This input is optocoupled and can be driven by both an NPN or PNP type command. The connections are indicated in the following diagrams:

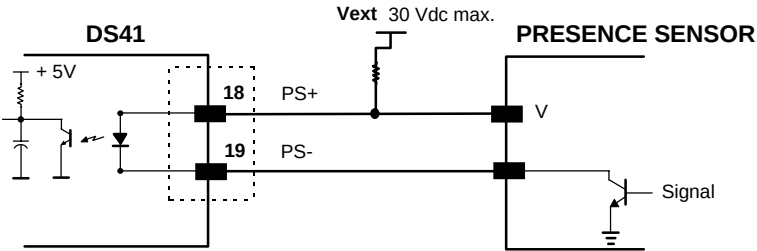


Figure 2.23 - Input NPN command using external power

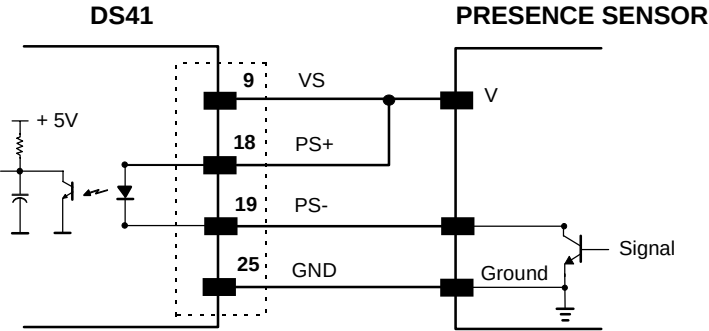


Figure 2.24 - Input NPN command using DS41 power

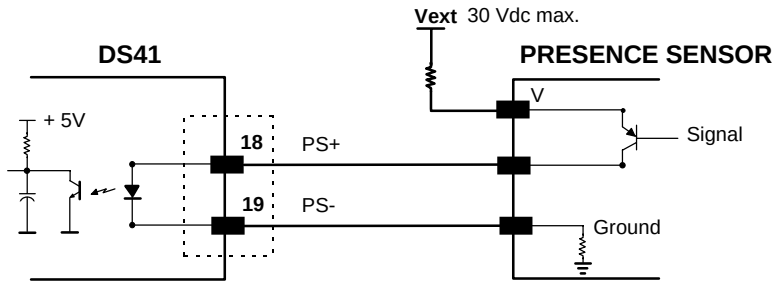


Figure 2.25 - Input PNP command using external power

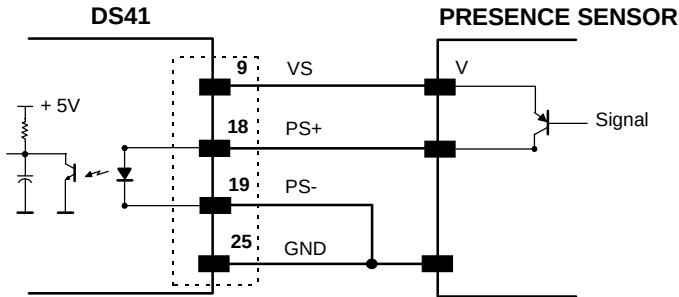


Figure 2.26 - Input PNP command using DS41 power

The electrical features are given below:

Maximum voltage	30 Vdc
Maximum current	25 mA

An anti-disturbance filter is implemented on the presence sensor input with a nominal delay of about 5 milliseconds.

2.7.5 Outputs

In addition to the pins relative to the communication interfaces as described in the previous paragraphs, the following pins are present on the 25-pin connector of the scanner:

Pin	Name	Function
8	NO READ+	No read output (+)
22	NO READ-	No read output (-)
11	RIGHT+	Right read output (+)
12	RIGHT-	Right read output (-)
14	WRONG+	Wrong read output (+)
15	WRONG-	Wrong read output (-)

The NO READ output activates when the code signalled by the presence sensor is not decoded.

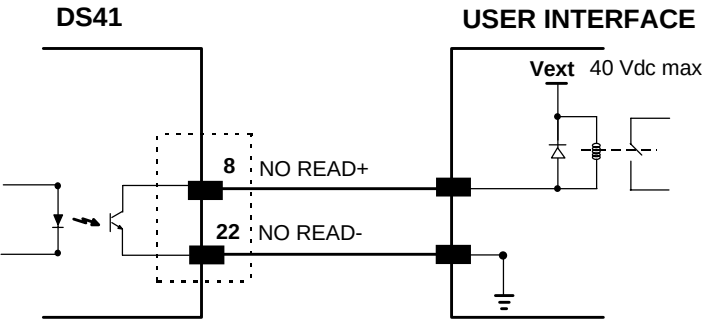


Figure 2.27 - NO READ output connection

The RIGHT output activates when the code is decoded correctly.

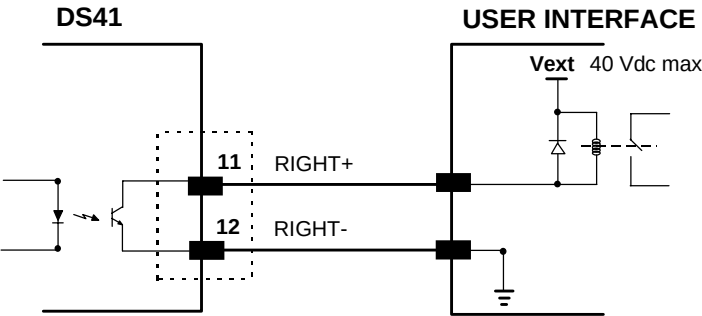


Figure 2.28 - RIGHT code output connection

The WRONG output is used either for "Verifier" mode or for PCS control (PCS control is available for DSP models only, see paragraph 1.3). For Verifier this output activates when the decoded code does not correspond to the one set in the configuration. For PCS this output activates when the PCS level is below the threshold value.

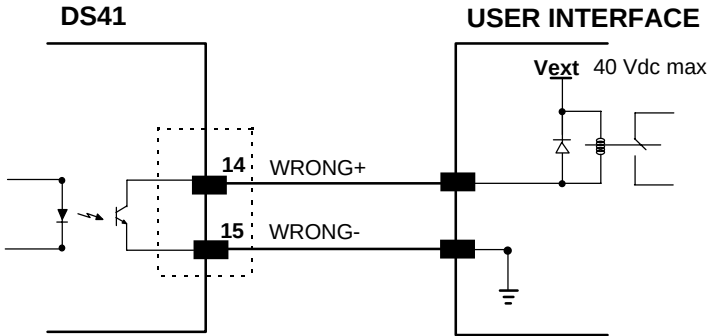


Figure 2.29 - WRONG code output connection

These outputs are all level or pulse programmable: a 50 ms pulse is generated in the second case. Further programming information is supplied in the section "Output Lines" in the WINHOST Help On Line.

2.8 POSITIONING

The DS41 scanner is able to decode moving barcode labels at a variety of angles, however significant angular distortion may degrade reading performance.

When mounting the DS41 take into consideration these three ideal label position angles: **Pitch 0°** , **Skew 10° to 30°** and **Tilt 0°**.

Follow the suggestions below for the best orientation:

The **Pitch** angle is represented by the value **P** in figure 2.30. Position the reader in order to **minimize** the **Pitch** angle.

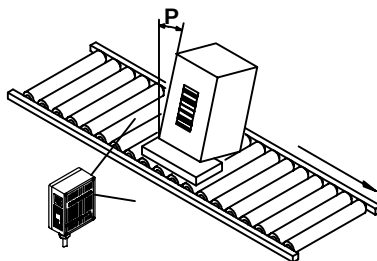


Figure 2.30 - Pitch angle

The **Skew** angle is represented by the value **S** in Figure 2.31. Position the reader to **assure at least 10°** for the **Skew** angle. This avoids the direct reflection of the laser light emitted by the DS41.

For raster models, this angle refers to the most inclined or external raster line, so that all other raster lines assure **more** than 10° Skew.

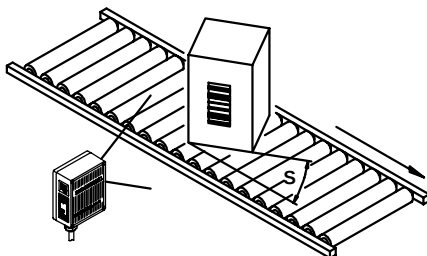


Figure 2.31 - Skew Angle

The **Tilt** angle is represented by the value **T** in figure 2.32. Position the reader in order to **minimize** the **Tilt** angle.

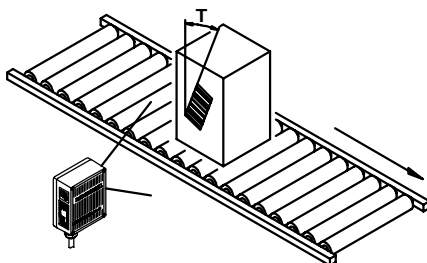


Figure 2.32 - Tilt angle

2.9 TYPICAL LAYOUTS

The DS41 barcode reader was specifically designed for industrial applications. A typical use is real time identification of moving objects on conveyor belts.

A photoelectric sensor used as a code presence sensor signals when an object enters the scanner reading zone (see Figure 2.33).

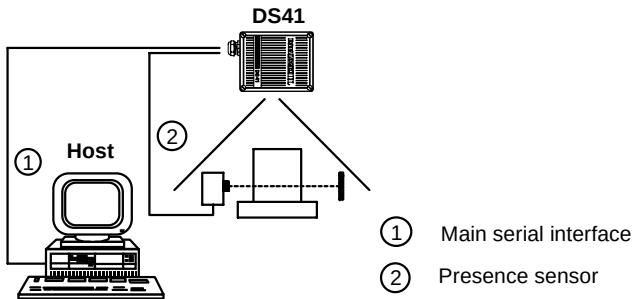


Figure 2.33 - DS41 typical layout

DS41 can be mounted vertically or horizontally to read labels in the two standard 'picket fence' or 'step ladder' positions. A system can be configured to read labels in any orientation using several scanners positioned at different angles.

For each application it is advised that the length of the scan line, the scan speed, the height of the bars and the code motion speed with respect to the scanner, allow at least five scans on the code.

The possibility of using raster models allows a greater surface area of the code to be scanned, increasing the probability of correct reads even if the code printing quality is poor or the code is positioned incorrectly.

2.9.1 Master-slave

The master-slave layout is used to collect data from several scanners to build a multi-sided reading system; there can be one master and up to 5 slaves connected with the RS485 polled mode on the main serial interface.

The master scanner is also connected to a host computer with the RS232 auxiliary interface.

The P.S. signal is unique to the system; there is a single reading phase and a single message from the master scanner to the host computer.

In every scanner the jumper block for the selection of the main serial interface type must be set for RS485 polled (see paragraph 2.4).

In every slave scanner the multidrop address selection must be set within the range from 0 to 4 max (see paragraph 2.7.2 under "RS485 polled interface").

The DIP switch selections in the master scanner are ignored.

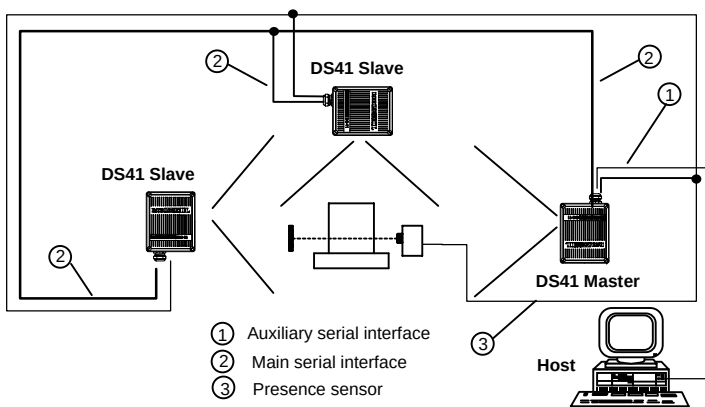


Figure 2.34 - Master-slave layout

NOTE

The auxiliary serial port of the slave scanners is only used for configuration.

The termination resistors of the RS485 bus must not be installed.

2.9.2 Local echo

In local echo mode data is transmitted on the auxiliary interface as well as on the main interface.

Host Mode programming can be accomplished either through the main interface or the auxiliary interface in local echo mode.

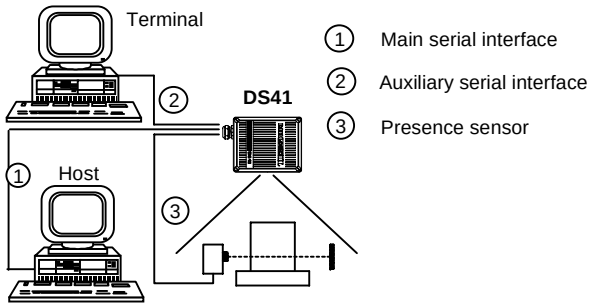


Figure 2.35 - Local echo layout

2.9.3 Pass through

Pass through mode allows two or more devices to be connected to a single external serial interface.

Each DS41 transmits the messages received by the auxiliary interface onto the main interface.

All messages will be passed through this chain to the host. The main and auxiliary ports are connected as shown in the figure below:

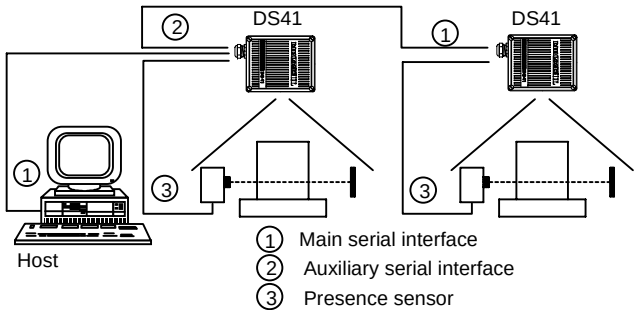


Figure 2.36 - Pass through layout

3 READING FEATURES

The number of reads performed by the DS41 and therefore the decoding capacity, is influenced by the following parameters:

- number of scans per second
- code motion speed
- label dimensions
- scan direction in respect to code motion

At least 5 scans during the code passage should be allowed to ensure a successful read.

3.1 STEP LADDER MODE

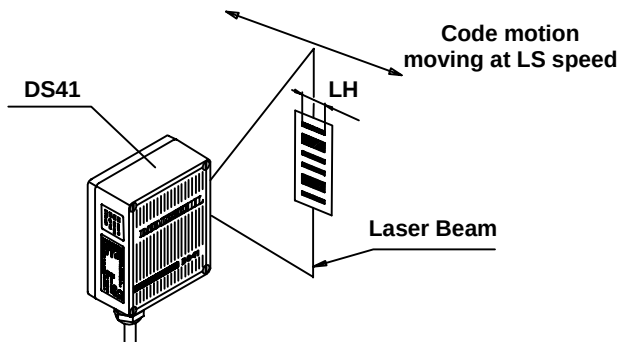


Figure 3.1 - "Step Ladder" scanning mode

If scanning is perpendicular to the code motion direction (Figure 3.1 - "step ladder" mode), the number of effective scans performed by the reader is given by the following formula:

$$SN = [(LH/LS) * SS] - 2$$

These symbols signify:

SN = number of effective scans

LH = label height (in mm)

LS = label movement speed (in mm/s)

SS = number of scans per second

For example, the DS41 (800 scans/sec.), for a 25 mm high code moving at 1250 mm/s performs:

$$[(25/1250) * 800] - 2 = 14 \text{ effective scans.}$$

3.2 PICKET FENCE MODE

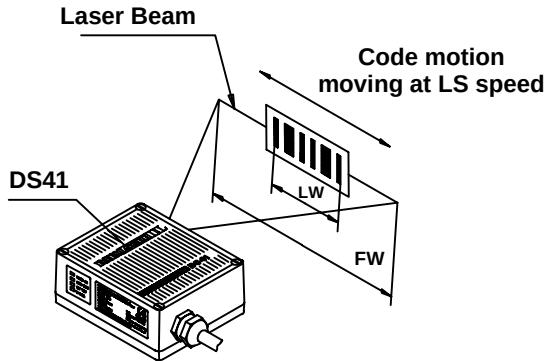


Figure 3.2 - "Picket Fence" scanning mode

If scanning is parallel to the code motion, (Figure 3.2 - "picket fence" mode), the number of effective scans is given by:

$$SN = [((FW-LW)/LS) * SS] - 2$$

These symbols signify:

- SN = number of effective scans
- FW = reading field width (in mm)
- LW = label width (in mm)
- LS = label movement speed (in mm/s)
- SS = scans per second

For example, for a 50 mm wide code moving in a point where the reading field is 250 mm wide at a 1500 mm/s speed, the DS41 (800 scans per sec.), performs:

$$[((250-50)/1500) * 800] - 2 = 104 \text{ scans}$$

3.3 PERFORMANCE

The DS41 scanner is available in four standard versions according to the optical resolution characteristics (see paragraph 1.3).

The Standard resolution version is a general purpose model whose optical resolution allows code reading from 0.20 mm to 1.00 mm narrow bars in the zone between 50 and 400 mm from the emission window. This version can distinguish between high density codes (between 0.20 mm and 0.30 mm) and low density codes (above 0.33 mm) by programming the software resolution parameter (see the section "Scanner Resolution" in the WINHOST Help On Line).

The Very High resolution version has an optical resolution that allows reading very high density codes (typical values from 0.10 mm to 0.20 mm narrow bars) in the zone from 55 to 125 mm from the emission window. The software resolution parameter for this version should be set to high (see the section "Scanner Resolution" in the WINHOST Help On Line).

The Raster version R1 is a raster model used to read codes from 0.20 mm to 1.00 mm narrow bars with a raster aperture of about 12 mm at a 200 mm distance.

The Raster version R2 is a raster model used to read codes from 0.20 mm to 1.00 mm narrow bars with a raster aperture of about 40 mm at a 200 mm distance.

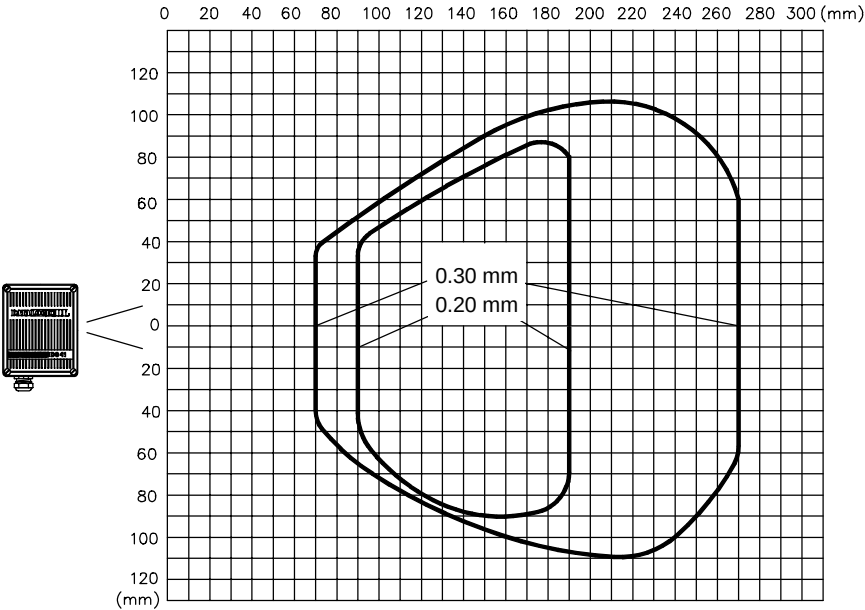
Refer to the diagrams given in paragraph 3.4 for further details on the reading features. These diagrams refer to the two standard optical versions and are taken on various resolution sample codes at a 25 °C ambient temperature, depending on the conditions in the notes under each diagram.

If standard devices do not satisfy specific requirements, contact your nearest Datalogic distributor, supplying code samples, to obtain complete information on the reading possibilities.

3.4 READING DIAGRAMS

DS41-1x and DS41-6x (Standard Resolution, 800 scans/s)

NOTE: (0,0) IS THE CENTER OF THE LASER BEAM OUTPUT WINDOW

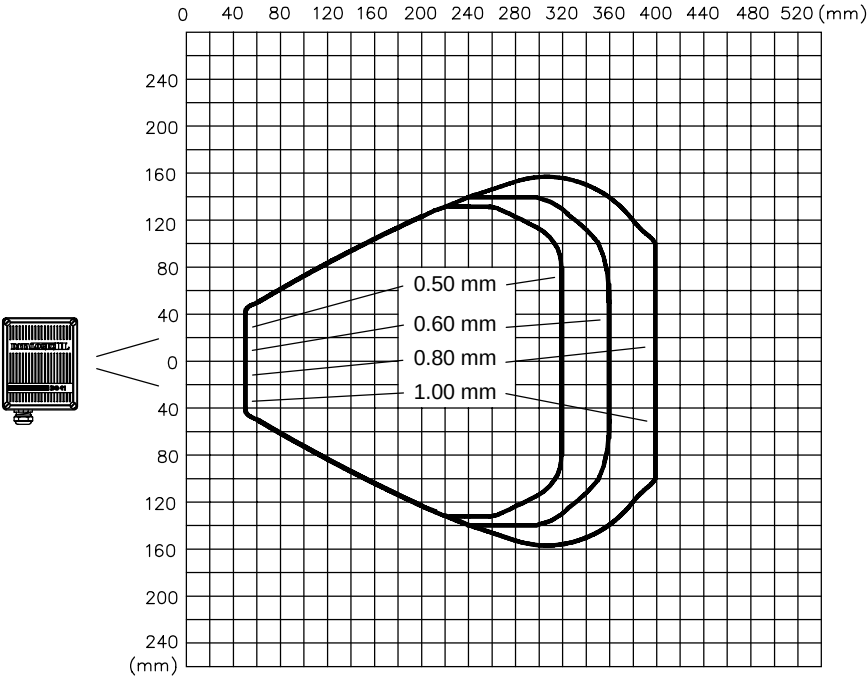


CONDITIONS:

Code	=	Interleaved 2/5 or Code 39
PCS	=	0.90
"Pitch" angle	=	0°
"Skew" angle	=	10°
"Tilt" angle	=	0°
SW Resolution	=	High

DS41-1x and DS41-6x (Standard Resolution, 800 scans/s)

NOTE: (0,0) IS THE CENTER OF THE LASER BEAM OUTPUT WINDOW

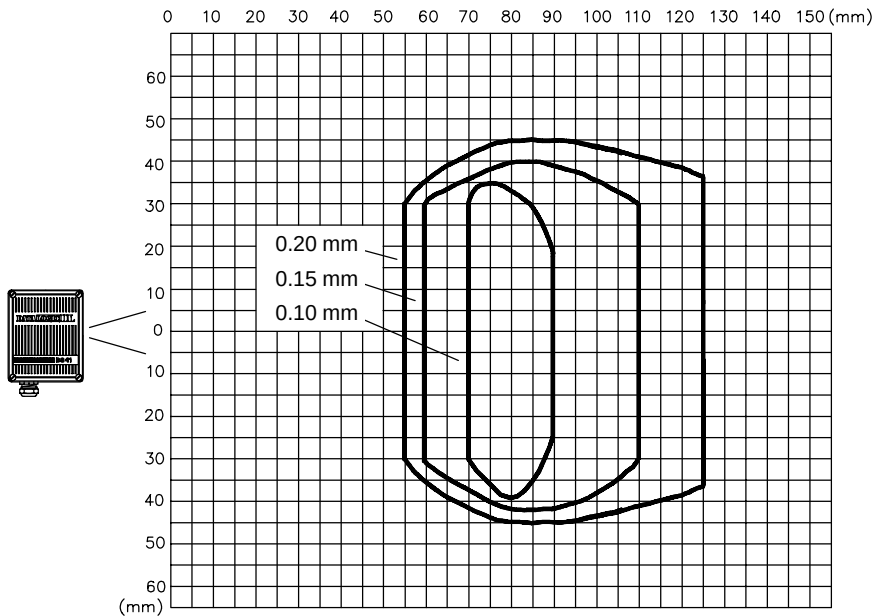


CONDITIONS:

Code	=	Interleaved 2/5 or Code 39
PCS	=	0.90
"Pitch" angle	=	0°
"Skew" angle	=	10°
"Tilt" angle	=	0°
SW Resolution	=	Low

DS41-2x and DS41-7x (Very High resolution, 800 scans/s)

NOTE: (0,0) IS THE CENTER OF THE LASER BEAM OUTPUT WINDOW



CONDITIONS:

Code	=	Interleaved 2/5 or Code 39
PCS	=	0.90
"Pitch" angle	=	0°
"Skew" angle	=	10°
"Tilt" angle	=	0°
SW Resolution	=	High

4 MAINTENANCE

4.1 CLEANING

Clean the laser beam output window periodically for continued correct operation of the reader.

Dust, dirt, etc. on the window may alter the reading performance.

Repeat the operation frequently in particularly dirty environments.

Use soft material and alcohol to clean the window and avoid any abrasive substances.

WARNING

Clean the window of the DS41 when the scanner is turned off or, at least when the laser beam is deactivated.

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5 TECHNICAL FEATURES

	DSP MODELS (Note 1)	NPP MODELS (Note 1)
ELECTRICAL FEATURES		
INPUT POWER		
Supply voltage	10 to 30 Vdc	
Power consumption max.	5 W	4 W
SERIAL INTERFACES		
MAIN	RS232, RS485 Non Polled, RS485 Polled, 20 mA Passive C. L.	
AUXILIARY	RS232	
BAUD RATES		
All Interfaces	150 to 19200	
CONTROL INPUTS		
PRESENCE SENSOR	(optocoupled NPN or PNP)	
Voltage max.	30 Vdc	
Input current max.	25 mA	
CONTROL OUTPUTS		
NO READ, RIGHT READ, WRONG READ	(optocoupled)	
V _{CE} max.	40 Vdc	
Collector current max.	40 mA continuous; 130 mA pulsed	
V _{CE} saturation	1V at 10 mA max.	
Power dissipation max.	90 mW at 40 °C (Ambient temp.)	
OPTICAL FEATURES		
Light source	Semiconductor laser diode	
Wave length (Note 2)	630 ~ 680 nm	
Safety class	Class 2	
READING FEATURES (Note 3)		
Scan rate	800 scans/second	
Reading distance	50 to 400 mm	
Maximum resolution	0.1 mm	
Aperture angle	60 degrees	
USER INTERFACE		
LED indicators	power, laser beam active, barcode decoded, presence sensor active, data transmission	

	DSP MODELS (Note 1)	NPP MODELS (Note 1)
SOFTWARE FEATURES READABLE CODE SYMBOLOGIES Code 93 (Standard and Full ASCII) EAN/UPC (including Add-on 2 and Add-on 5) Code 39 (Standard and Full ASCII) 2/5 Interleaved Codabar Code 128 EAN 128 Plessey	Up to 22 readable symbologies including:	
	• • • • • • •	• • • • • • •
CODE SELECTION	up to six codes during one reading phase	
CODE POSITON	can be verified and displayed	cannot be verified and displayed
DECODING SAFETY	can enable multiple good reads of same code	
HEADERS AND TERMINATORS	up to four headers and four terminators	
OPERATING MODES	ON LINE, AUTOMATIC, SERIAL ON LINE, TEST	
CONFIGURATION MODES	• through menus using WINHOST utility • receiving commands from one of the serial ports (HOST MODE)	
PARAMETER STORAGE	Non-volatile internal EEPROM	
ENVIRONMENTAL FEATURES Operating temperature (Note 4) Storage temperature Humidity max. Vibration resistance Shock resistance Protection class	0 to 40 °C -20 to 70 °C 90% non condensing IEC 68-2-6 test FC 1.5 mm; 10 to 55 Hz; 2 hours on each axis IEC 68-2-27 test EA 30G; 11 ms; 3 shocks on each axis IP65	
PHYSICAL FEATURES Mechanical dimensions Weight	101 x 83.5 x 42 mm 800 g.	

Note 1: Refer to paragraph 1.3 for model descriptions.

Note 2: The features given are typical at a 25 °C ambient temperature (if not otherwise indicated).

Note 3: Further details given in paragraphs 3.3 and 3.4.

Note 4: If the reader is used in high temperature environments (over 35 °C), use of the Beam shutter is advised (for details refer to the section "Beam shutter" in the Help On Line of the WINHOST utility program provided with the DS41 disk.

5.2 - Technical features